

- (a) 2-chloro-5-hydroxyhexane
 (b) 2-hydroxy-5-chlorohexane
 (c) 5-chlorohexan -2-ol
 (d) 2-chlorohexan -5-ol
13. $\text{CH}_3\text{CH}_2\text{OH}$ can be converted into CH_3CHO by
 (a) catalytic hydrogenation
 (b) treatment with LiAlH_4
 (c) treatment with pyridinium chlorochromate
 (d) treatment with KMnO_4
14. The hybridisation of various xenon complexes are as follow:

S. No.	Complex	Hybridisation
1	XeF_2	sp^3d
2	XeO_3	sp^3
3	XeF_4	sp^3d^2

- The complex which contains maximum number of lone pairs is
 (a) XeO_3 (b) XeF_2 (c) XeF_4 (d) Both XeF_2 and XeO_3
15. Which of the following was first used for curing syphilis?
 (a) Penicilin (b) Equanil (c) Salvarsan (d) Chlorampheniol

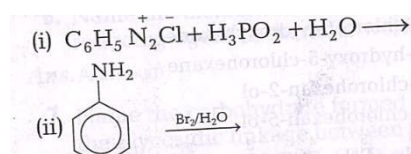
Assertion-Reason

In the following questions, a statement of Assertion is followed by a corresponding statement of Reason. Of the following statements, choose the correct one.

- (a) Both Assertion and Reason are correct statements and Reason is the correct explanation of the Assertion.
 (b) Both Assertion and Reason are correct statements, but Reason is not the correct explanation of the Assertion.
 (c) Assertion is correct, but Reason is incorrect statement.
 (d) Assertion is incorrect but reason is correct statement.
16. **Assertion** It is difficult to replace chlorine by – OH in Chlorobenzene in comparison to that in chloroethane.
Reason Chlorine carbon (C – Cl) bond in Chlorobenzene has partial double bond character due to resonance.
17. **Assertion** Phenols give o-and p-nitrophenol on nitration with conc. HNO_3 and H_2SO_4 mixture.
Reason OH group in phenol is o-, p- directing.
18. **Assertion** All naturally occurring α - aminoacids except glycine are optically active.
Reason Most naturally occurring amino acids have L-configuration.
19. **Assertion** Chromium is a typical hard metal, while mercury is a liquid.
Reason In Cr, there are six unpaired electrons, whereas in Hg, there is no unpaired electron.
20. **Assertion** Chelating ligands form more stable complexes than the unidentate analogs.
Reason When chelation occurs in the complexes, entropy decreases.

SECTION: B

21. Complete the following reactions:

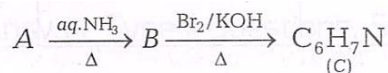


22. Write one similarity and one difference between the chemistry of lanthanoids and that of actinoids.
23. The standard oxidation potential of Ni/Ni^{2+} electrode is 0.236 V. if this is combined with at what pH of the solution will measured emf be zero at 25°C ?

24. Answer the following
- (i) What is the role of following complex in analytical chemistry?
 (a) EDTA (b) DMG
- (ii) Arrange the following complex ions in increasing order of crystal field splitting energy (Δ_0).
 $[\text{CrCl}_6]^{3-}$, $[\text{Cr}(\text{CN})_6]^{3-}$, $[\text{Cr}(\text{NH}_3)_6]^{3+}$
- OR
- Write the IUPAC nomenclature and also draw structural isomers of $[\text{Cr}(\text{NH}_3)_4 \text{Cl}_2]^+$ and $[\text{Co}(\text{en})_3]^{3+}$ complex.
25. Answer the following:
- (i) Why, coagulation takes place when NaCl solution is added to a colloidal solution of ferric hydroxide?
 (ii) Why, sun looks red at the time of sunset?
26. Sulphuric acid is not used during the reaction of alcohols with KI. Give reason.
- OR
- Phenol is more easily nitrated than benzene. Why?
27. Co(III) forms paramagnetic octahedral complex with weak field ligands whereas it forms diamagnetic octahedral complex with strong field ligands. Compile the give information and explain it in you own words.

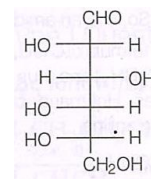
SECTION: C**(Long answer type | questions)**

28. (i) Complete the following reactions:
- (a) $\text{CH}_3\text{CH}_2\text{CH}_2\text{CH}_2\text{Cl} \xrightarrow{\text{Alc. KOH}}$
- (b) $\text{CH}_3\text{CH}_2\underset{\text{Cl}}{\text{CH}}\text{CH}_3 \xrightarrow{\text{Alc. KOH}}$
- (ii) What is the type of the above reactions?
 (iii) Predict the major product formed in reaction(b).
29. Describe the role of
- (i) NaCN in the extraction of gold from gold ore.
 (ii) SiO_2 in the extraction of copper from copper matte.
 (iii) cryolite in the metallurgy of aluminium.
30. Deduce the shapes of the following on the basis of VSEPR theory.
 (a) BrF_3 (b) I_3^- (c) IF_7
31. An aromatic compound A on treatment with aqueous ammonia on heating forms a compound B, which on heating with Br_2 and KOH forms a compound C of molecular formula $\text{C}_6\text{H}_7\text{N}$. Write the structures and IUPAC names of compounds A, B and C.



- (i) Illustrate the Gattermann reaction with an example.
 (ii) Give chemical tests to distinguish between a primary and a secondary amine.

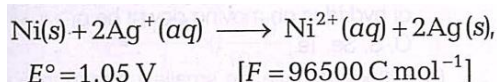
32. The letters 'D' or 'L' before the name of a stereoisomer of a compound indicate the correlation of configuration of that particular stereoisomer. This refers to their relation with one of the isomers of glyceraldehyde. Predict whether the following compound has 'D' or 'L' configuration.



- (ii) Aldopentoses named as ribose and 2-deoxyribose are found in nucleic acids. What is their relative configuration?

OR

- (i) Monosaccharides contain carbonyl group hence are classified, as aldose or ketose. The number of carbon atoms present in the monosaccharide molecule are also considered for classification. In which class of monosaccharide will you place fructose?
- (ii) In nucleoside, a base is attached at '1' position of sugar moiety. Nucleotide is formed by linking of phosphoric acid unit to the sugar unit of nucleoside. At which position of sugar unit is the phosphoric acid linked in a nucleoside to give a nucleotide?
33. (i) Express the relation between conductivity of a solution cell constant.
(ii) Determine the values of equilibrium constant (K_c) and ΔG^0 for the following reactions as 25°C.



34. Calculate the mass of a non-volatile solute (molar mass = 40 g mol⁻¹) which should be dissolved in 114 g octane to reduce its vapour pressure to 80%?

SECTION - D

35. (i) On heating compound (A) gives a gas (B) which is a constituent of air. This gas when treated with 3 moles of hydrogen (H₂) in the presence of a catalyst gives another gas (C) which is basic in nature. Gas C on further oxidation in moist condition gives a compound(D) which is a part of acid rain. Identify compounds (A) and (D) and also give necessary equations of all the steps involved.
(ii) Describe the following:
(a) The stability of oxoacids of chlorine increases in the order.
 $\text{HClO} < \text{HClO}_2 < \text{HClO}_3 < \text{HClO}_4$
(b) Fluorine exhibits an oxidation state of -1 only, while other elements of the family exhibits oxidations state of -1, +1, +3, +5 and +7.
(c) F₂ is more reactive than ClF₃ which is more reactive than Cl₂.

OR

- (i) What happens, when
(a) potassium chlorate (KClO₃) is heated in the presence of manganese dioxide (MnO₂)?
(b) copper reacts with concentrated H₂SO₄?
(ii) Explain the following trends in the properties of the elements compounds of p-block.
(a) Thermal stability decreases from H₂O to H₂Te.
(b) Fluoride ion has higher hydration enthalpy than chloride ion.
(c) Electron gain enthalpies of halogens are largely negative.
36. For first order decomposition,
 $X \rightarrow Y + Z$, rate constant is given by $k = (4.6 \times 10^{14} \text{ s}^{-1}) e^{-54000/RT}$
Where, the energy of activation is in calories. Calculate
(i) temperature at which X would decompose at the rate of 1% per second
(ii) temperature where decomposition is 80% complete in 1h.

OR

(i) In a reaction, if the concentration of the reactant R is quadrupled, the rate of reaction becomes sixty four times. What is the order of reaction?

(ii) The rate constant of a reaction increased by 7% when its temperature is raised from 300 K to 301 K while its equilibrium constant increases by 3%. Calculate the activation energy of the forward and backward reactions. (Given, $\Delta_r H^\circ = 22.19 \text{ kJ/mol}$)

37. An organic compound 'A' with molecular formula $\text{C}_6\text{H}_6\text{O}$ reacts with zinc dust to give a hydrocarbon 'B' which upon reaction with CH_3Cl in the presence of anhydrous AlCl_3 gives 'C'. Compound C on oxidation with alkaline KMnO_4 gives compound D. Compound A, B, C, D and E; also justify your answer by giving relevant chemical equations.

OR

(i) How will you convert

(a) phenol into picric acid?

(b) cumene into phenol?

(ii) Write the structures of A and B in the following reactions:

